What I claim is:

1. An exhaust gas purification apparatus of an engine comprising:

a nitrogen oxide reduction catalyst arranged in an engine exhaust gas passage to reduce and purify nitrogen oxide in exhaust gas using a liquid reducing agent;

a nozzle having an injection hole that opens into the exhaust gas passage, and positioned on an exhaust gas upstream side of said nitrogen oxide reduction catalyst;

an operating state detecting device that detects an engine operating state;

a reducing agent injection-supply device capable of injection-supplying a liquid reducing agent into the exhaust gas passage from said nozzle injection hole, based on the engine operating state detected by said operating state detecting device; and

a high pressure air supply device that supplies high pressure air into said nozzle for a predetermined period, when an injection flow rate of the liquid reducing agent from said reducing agent injection-supply device becomes zero.

2. An exhaust gas purification apparatus of an engine according to claim 1, wherein said reducing agent injection-supply device reduces a pressure of compressed air stored in an air reservoir tank to a predetermined pressure, and mixes the compressed air whose pressure is reduced with the liquid

reducing agent to transform into an atomized state, and then injection-supplies this from said nozzle injection hole into the exhaust gas passage.

3. An exhaust gas purification apparatus of an engine according to claim 2, wherein said high pressure air is compressed air which is stored in said air reservoir tank.

4. An exhaust gas purification apparatus of an engine according to claim 2, further comprising an air compressor for pressurizing the atmosphere to a predetermined pressure, and said high pressure air is compressed air which has been pressurized by said air compressor.

5. An exhaust gas purification apparatus of an engine according to claim 2, comprising

a pressure-reducing device that can be switched to either let compressed air stored in said air reservoir tank pass through directly, or to reduce the pressure to a predetermined pressure as it passes through, and

said reducing agent injection supply device and said high pressure air supply device exclusively each use the compressed air that has been reduced in pressure to a predetermined pressure by said pressure reducing device, and compressed air that has passed though directly.